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NORTHEAST MISSOURI STATE TEACHERS COLLEGE
Kirksville, Missouri

ACKNOWLEDGMENTS

The writer wishes to express sincere appreciation for the
invaluable guidance, assistance and recommendations received

AN INVESTIGATION OF THE PHYSICAL MECHANISMS
OF THE REMINGTON, ROYAL, UNDERWOOD AND
SMITH-CORONA STANDARD TYPEWRITERS
from Dr. Paul G. Division, Northeast Missouri State Teachers College, Kirksville,
Missouri, which enabled the writer to prepare this manuscript.

It would be impossible also to express adequately the
A Thesis Submitted in Partial Fulfillment of the
appreciation to Dr. Requirements of the Degree of
Master of Arts
Business Division, Northeast Missouri State Teachers College
for his helpful criticisms and constant aid.

To the Baldwin Typewriter Company and the four typewriter
manufacturers, whose typewriters were used, the writer extends
his gratitude for their assistance and valuable information.

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It would be impossible also to express adequately the appreciation to Mr. Ralph Monay, Associate Professor of the Business Division, Northeast Missouri State Teachers College, for his helpful criticisms and constant aid.

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of the typewriters and adjust the methods of teaching so as to prepare the student to be more proficient with the typewriter and thereby enabling the student to reach a maximum in typing power.

Correct adjustments could be taught if the teacher is able to comprehend the findings and differences in a way that students can be led to understand the WHY.

It also can be used to aid the teacher in the selection of equipment which will be of great convenience and use to students as well as to the school system.

The writer feels therefore that he is almost walking on untried ground when he tries a thesis in which he attempts to

I. INTRODUCTION

In a teacher-training institution it is likely that investigations have to do with the improvement of teaching. The

teacher of typewriting is quite likely to investigate methods of teaching typewriting, evaluation of textbooks, testing, grading, and other phases of classroom work.

Seldom has the teacher given consideration to the materials which are to be used in the teaching of typewriting other than that of the textbook. Rare indeed is the teacher or prospective teacher who has interested himself in the typewriter itself, although it is the material of greatest concern to him.

This thesis may aid the teacher or prospective teacher in presenting the mechanisms of the individual typewriters with a broader knowledge which will be of benefit to the student as well as to the teacher.

The teacher would be able to analyze the different parts of the typewriters and adjust the methods of teaching so as to prepare the student to be more proficient with the typewriter and thereby enabling the student to reach a maximum in typing power.

Correct adjustments could be taught if the teacher is able to comprehend the findings and differences in a way that students can be led to understand the WHY.

1. Norton, F. H., "The Work Required to Operate Several Makes of Typewriters." Transactions American Society of Mechanical Engineers, 1927-28, pages 29-37.

It also can be used to aid the teacher in the selection of equipment which will be of great convenience and use to students as well as to the school system.

The writer feels therefore that he is almost walking on untried ground when he tries a thesis in which he attempts to go into the comparison of four of the standard typewriters such as are found in classrooms and offices. Such a study is not to be confused with an engineer's study of the comparative worth of the four typewriters. Had he the facilities the writer might have undertaken a comparison of the energy expounded in the operation of each typewriter. Such a study was made some years ago by F. H. Norton,¹ and reported in "The Work Required to Operate Several Makes of Typewriters" in 1927-28, although the writer-investigator failed to identify the makes by their trade names. The facilities for such a study however, would be those of a special physics laboratory.

Or the writer might have undertaken a study for the consumer's point of view and measured, if he had the apparatus, the length of life that had been built into each typewriter. But the apparatus was not available to him, valuable as such a study might be.

The writer therefore undertook his study of four standard typewriters by comparing and measuring the four in ways which are simple, by observation, or by use of the foot-rule or other readily obtainable devices.

1. Norton, F. H., "The Work Required to Operate Several Makes of Typewriters." Transactions American Society of Mechanical Engineers, 1927-28, pages 29-37.

The writer believes that he has the possibility of accomplishing these things:

1. To teach himself the many differences of construction that are to be found on these four standard typewriters.

2. To expose to others these many differences of which great numbers of people are not aware.

3. Indirectly to increase an interest in the interesting different brands of typewriters of standard size and design, technological devices which are represented in typewriter recent models, which were believed to be the comparable products of four major typewriter-manufacturing companies.

4. To point out some discoverable advantages that one machine might have over others.

5. By his daring in making an investigation in a field heretofore virtually closed to teachers and teacher-training students, he hopes to lead others to similar investigations of typewriters and typewriting classroom materials.

A typewriter may be said to consist of:

(1) The key controls--a keyboard of 42 keys, a space bar, and various operating keys--tabular manipulations, shift keys, touch control, etc.

(2) The printing mechanism necessary to activate the keys and other moving parts.

(3) The carriage with various accessories and devices of convenience.

(4) The ribbon and its mechanisms.

(5) The frame, consisting of supporting plates and bars, various cover plates, and four rubber feet.

(6) The bell and line lock.

(7) Tabulating mechanisms.

In the comparisons hereafter made, parts (4), (5), (6), and (7), have been neglected: of the comparisons made by the writer.

In the development of the comparisons of parts (1), (2), and (3), the writer discovered that he had considerable work

II. PROCEDURE

to do and a great many things to learn.

Descriptions of mechanisms are difficult to make, especially by one who is not educated in mechanical engineering. The project of this thesis was the comparison of four different brands of typewriters of standard size and design, recent models, which were believed to be the comparable products of four major typewriter-manufacturing companies.

The four typewriters selected are identified in Table I: profession. Illustrations have been used where they have been

Table I

| | <u>Serial Numbers</u> | <u>Year of Models</u> |
|-------------------|-----------------------|-----------------------|
| Royal..... | KMM-3469025 | 1948 - late |
| Remington..... | J-1282663 | 1949 |
| Underwood..... | 11-6410454 | 1949 |
| Smith-Corona..... | 2A2251178-11 | 1949 |

A typewriter may be said to consist of:

(1) The key controls--a keyboard of 42 keys, a space bar, and various operating keys--tabular manipulations, shift keys, touch control, etc.

(2) The printing mechanism necessary to activate the keys and other moving parts.

(3) The carriage with various accessories and devices of convenience.

(4) The ribbon and its mechanisms.

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(6) The bell and line lock.

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In the development of the comparisons of parts (1), (2), and (3), the writer discovered that he had considerable work to do and a great many things to learn.

Descriptions of mechanisms are difficult to make, especially by one who is not educated in mechanical engineering. Moreover a technical language probably would not be suitable to a teachers project, since this thesis, if it attracts any readers at all, will quite likely draw them from the teaching profession. Illustrations have been used where they have been obtainable.

A few comparisons which were made do not fit into any of the divisions. The four typewriters were weighed and overall measurements were made. These are marked differences and are given here:

There is an eight pound difference between the heaviest and the lightest machine. The table below shows the comparative weights:

Table II

| | <u>Pounds</u> |
|-------------------|---------------|
| Smith-Corona..... | 27 |
| Royal..... | 28 |
| Remington..... | 32 |
| Underwood..... | 35 |

The greater weight of certain machines would have the advantage of giving greater stability on a table top when it was not anchored. The greater weight would be a disadvantage

if the machines were to be moved about.

The overall measurements of the machines as to length (side to side), width (front to back), and height are shown in Table III.

Table III

| | <u>Length</u> | <u>Width</u> | <u>Height (inches)</u> |
|-------------------|---------------|--------------|------------------------|
| Remington..... | 14 1/2 | 17 | 9 2/4 |
| Smith-Corona..... | 15 | 16 | 9 3/4 |
| Underwood..... | 12 1/2 | 16 | 9 1/4 |
| Royal..... | 15 | 15 1/2 | 9 1/4 |

The differences are probably too slight to have any significance.

in this chapter as follows:

1. Key banks, page 7,
2. Shift key, page 8,
3. Shift lock, page 8,
4. Back spacer, page 9,
5. Space bar, page 10,
6. Tabular stop set key, page 10,
7. Tabular bar, page 12,
8. Tabular stop clear key, page 13,
9. Margin release, page 13,
10. Touch control, page 15,
11. Ribbon indicator, page 16,
12. Ribbon reverse lever (manual), page 17.

1. KEY BANKS

Table IV

| | Elevation Between Rows 1 and 2 | Elevation Between Rows 2 and 3 | Elevation Between Rows 3 and 4 |
|--|--------------------------------------|--------------------------------------|--------------------------------------|
|--|--------------------------------------|--------------------------------------|--------------------------------------|

III. THE KEY CONTROLS

Various manipulative features of a typewriter are found at the front of the machine--the character keys, and many buttons and bars associated with manual operation. These have been included under the heading of "The Key Controls."

These twelve common features of the typewriter are compared in this chapter as follows:

1. Key banks, page 7,
 2. Shift key, page 8,
 3. Shift lock, page 8,
 4. Back spacer, page 9,
 5. Space bar, page 10,
 6. Tabular stop set key, page 10,
 7. Tabular bar, page 12,
 8. Tabular stop clear key, page 13,
 9. Margin release, page 13,
 10. Touch control, page 15,
 11. Ribbon indicator, page 16,
 12. Ribbon reverse lever (manual), page 17.
- shown to be 3/16 inch in every case. This is not exactly accurate because on the Remington, Royal, and Underwood the top row of keys is further back. On these machines the fourth row is 1/4 inch away from the third row, while on the Smith-Corona it is 3/16 inch, the same distance as found between other rows.

1. KEY BANKS

Table IV

| | Elevation Between Rows 1 and 2 | Elevation Between Rows 2 and 3 | Elevation Between Rows 3 and 4 |
|-----------------|--------------------------------------|--------------------------------------|--------------------------------------|
| Remington..... | 6/16 in. | 6/16 in. | 7/16 in. |
| Royal..... | 8/16 in. | 7/16 in. | 8/16 in. |
| Underwood..... | 6/16 in. | 6/16 in. | 6/16 in. |
| Smith-Corona... | 7/16 in. | 7/16 in. | 7/16 in. |

| | Key Spread, Left to Right | Distance Between Rows, Front to Back |
|-----------------|------------------------------|-----------------------------------------|
| Remington..... | 2/8 in. | 3/16 in. |
| Royal..... | 3/8 in. | 3/16 in. |
| Underwood..... | 3/8 in. | 3/16 in. |
| Smith-Corona... | 3/8 in. | 3/16 in. |

It will be noted that on the Remington, the elevation of row 4 over row 3 is greater than of row 3 over row 2 or row 2 over row 1. On the Royal the elevations are irregular, as shown in the table. On the Underwood and Smith-Corona the elevations are regular.

The Remington has less distance left to right, between keys, showing a spread of 2/8 inch where other machines have a spread of 3/8 inch. This does not mean that the keys are farther apart. It means only that the Remington has a longer key face than do the other machines.

In Table IV, the distance between rows, front to back, is shown to be 3/16 inch in every case. This is not exactly accurate because on the Remington, Royal, and Underwood the top row of keys is further back. On these machines the fourth row is 1/4 inch away from the third row, while on the Smith-Corona it is 3/16 inch, the same distance as found between other rows.

2. SHIFT KEY

The pair of shift keys on all machines is at each side of the first row of the keyboard. On the Smith-Corona and Royal the shift keys are even with the first row of keys and they are slightly larger than the regular keys. On the Royal the shift keys are rectangular in shape, while the other machines had smaller keys somewhat oval in shape. Literature from typewriter companies indicates that the user can have some choice of sizes of the shift key.

The Remington and Underwood shift keys are elevated a fraction above the first row of keys and they too, are larger than the regular keys.

To shift on the Remington, Underwood and Smith-Corona the shift keys (if the key is depressed completely) must be depressed approximately three-fourths of an inch, while on the Royal the key has to be depressed one inch. For speed purposes the first three typewriters could save the operator some time. All machines have the popular basket shift and operate in the same manner.

The shift key also is the shift key lock release key. It does not operate as a regular stroke key but must be depressed so the basket has a chance to drop and the key has a chance to hit the platen when the basket is at its lowest level.

It is marked "BACK SPACER."

3. SHIFT LOCK

The shift lock on the Smith-Corona and the Royal are located on the left side of the keyboard between the home and third row

of keys, in which position the shift lock is elevated just slightly above the second row. Depressing the shift lock clamps the lock into position; the release on either machine can be made with the left or the right shift keys.

The Remington and Underwood have two shift locks, one on the left and one on the right. The Smith-Corona and the Royal have one shift lock which is on the right. But on any machine any shift lock is released with either the left or the right

| | Length | Width | First row | spacing |
|---------------|-----------------|---------------|---------------|----------------|
| Corona. | 6 $\frac{7}{8}$ | $\frac{1}{2}$ | $\frac{1}{8}$ | $\frac{5}{16}$ |
| Underwood.... | 7 $\frac{5}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{7}{16}$ |
| Remington.... | 7 $\frac{4}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{6}{16}$ |
| Royal..... | 7 $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{1}{4}$ | $\frac{6}{16}$ |

4. BACK SPACER

On all machines the back spacer key is at the left and nearly even with the top row of the keyboard. Each full depression of this key back spaces the carriage one full space. The Smith-Corona back spacer is the same size as the regular keys with an arrow pointing to the right as its distinguishing mark. The Underwood back spacer is elevated slightly above the regular top row of keys. It seems to give the operator a touch advantage in locating the key quickly. It is marked "BACK SPACER."

The Royal back spacer which is oblong, is the same size as its shift and tabular keys. This also gives the operator some advantage in locating the back spacer more rapidly. It is marked "BACK SPACER." The Remington with its enlarged back spacer seems to aid the operator in finding the key quickly with ease and confidence. It is marked with an arrow pointing to the right. between the numeral 9 and 0 keys just above the top row. This

5. SPACE BAR

The space bars on all machines vary in size, shape, angulation and distance from the first row of keys. Its purpose is to space between characters. It can be operated with either thumb. (All measurements are in inches.)

Table V

| | Length | Width | Distance to first row | Distance for spacing |
|---------------|-----------------|---------------|-----------------------|----------------------|
| Smith-Corona. | 6 $\frac{7}{8}$ | $\frac{1}{2}$ | $\frac{1}{8}$ | $\frac{5}{16}$ |
| Underwood.... | 7 $\frac{5}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{7}{16}$ |
| Remington.... | 7 $\frac{4}{8}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | $\frac{6}{16}$ |
| Royal..... | 7 $\frac{3}{8}$ | $\frac{1}{2}$ | $\frac{1}{4}$ | $\frac{6}{16}$ |

The top of the Royal, Underwood and Smith-Corona bars are flat, while the Remington tabular bar has a tilt of approximately 20-degrees. On page 11 the space bars of the four machines are illustrated.

The Underwood, Remington and Smith-Corona have two hooks under the space bar to regulate the height of its return. The Royal has three such hooks attached to its space bar.

6. TABULAR STOP SET KEY

The tabular stop set key on all machines is on the right side of the keyboard. On the Remington it is above the margin release key and to the left of the automatic right margin. To set a tab the operator depresses the key at the desired position.

The tabular stop on the Smith-Corona is level with the tabular bar on the right side of the keyboard. It is located between the numeral 9 and 0 keys just above the top row. This

bar operates the same as the Remington tabular bar.

The Royal's tabular SPACE BARS is just above the tabular bar on the right side of the machine. Its operation differs from the other machines. It must be pushed inward on the front plate in order to operate. The major difference between the Royal tabular stop set key and the other three typewriters is that the Royal has to be pushed inward instead of down.

The tabular stop set key on the Underwood is to the right of the tabular bar and just above the "Q" key on the top row. It operates the same as the Remington and the Smith-Corona.

7. TABULAR BAR

The tabular bars on the Remington, Smith-Corona and Underwood are above the keyboard or above the top row of keys. The Remington and Underwood tabular bars are approximately 4 inches long and extend just above the figures 1 to 9. The Smith-Corona bar is 3 1/2 inches long and is in approximately the same position as the other two typewriters.

The Royal differs from the other three typewriters because its tabular bar is even with the top row of keys on the right side of the machine, it is one inch by one-half inch in measurement.

Compared to the first three machines the Royal typewriter is not as convenient to operate because it would properly be operated by the little finger only, while on the other three

- | | |
|--------------|-----------------|
| 1. Royal | 3. Smith-Corona |
| 2. Remington | 4. Underwood |

After one has set the tabular stops at the desired positions,

bar operates the same as the Remington tabular bar.

The Royal's tabular stop set key is just above the tabular bar on the right side of the machine. Its operation differs from the other machines. It must be pressed inward on the front plate in order to operate. The major differences between the Royal tabular stop set key and the other three typewriters is that the Royal has to be pushed inward instead of down.

The tabular stop set key on the Underwood is to the right of the tabular bar and just above the "O" key on the top row. It operates the same as the Remington and the Smith-Corona.

7. TABULAR BAR

The tabular bars on the Remington, Smith-Corona and Underwood are above the keyboard or above the top row of keys. The Remington and Underwood tabular bars are approximately 4 inches long and extend just above the figures 4 to 9. The Smith-Corona bar is 3 1/2 inches long and is in approximately the same position as the other two typewriters.

The Royal differs from the other three typewriters because its tabular bar is even with the top row of keys on the right side of the machine, it is one inch by one-half inch in measurement.


Compared to the first three machines the Royal typewriter is not as convenient to operate because it would properly be operated by the little finger only, while on the other three typewriters the tabular bar can be operated by either hand.

After one has set the tabular stops at the desired positions,

the carriage can be skipped from one stop to the next by row depressing the tabular bar. the other keys, and is marked "M-R."

Royal's margin release is located on the right side of

8. TABULAR STOP CLEAR KEY three and four and about one-eighth inch The tabular stop clear key on all machines is on the left side on the upper part of the keyboard. located below the tabular The depression of this key will clear any tabular stop which has been set at the point where the clear key is applied on any of the typewriters. "M-R." This key differs from the other three On the Remington, Royal and Underwood it can also be used to clear all the stops which may have been set. To do this the carriage is pulled either from left to right or from right to left while depressing the tabular stop clear key.

The Smith-Corona will clear only one key at a time with its tabular clear key that is on the keyboard. It has a special lever  on the right of the marginal stops on the upper right of the carriage, which is used to clear all the tabular stops. By depressing the lever and pulling the carriage either from left to right or from right to left the machine's tabular stops are cleared.

Smith-Corona the margin release also serves to permit the carriage to be drawn back past the

9. MARGIN RELEASE point so that typing could be inserted on the

left Margin releases on all machines are to the right side of the keyboard, but their positions vary somewhat. On the Underwood it is to the right of the top row of keys and elevated the three-sixteenths of an inch. It is the same size key as the other keys on the keyboard. The words "MARGIN RELEASE" are printed on the key. special left margin release latch.

The Smith-Corona margin release is even with the top row of keys, the same size as the other keys, and is marked "M-R."

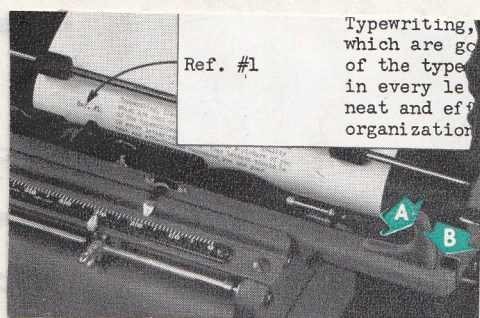
Royal's margin release is located on the right side of the keyboard between rows three and four and about one-eighth inch below the fourth row. The key is marked "MAR REL."

The Remington's margin release is located below the tabular set and automatic margin keys. It is to the right of the keyboard and is elevated slightly above the top row of keys. It is marked "MARGIN RELEASE." This key differs from the other three in size. It is nearly twice the size as compared to the other three typewriter marginal releases, giving the operator more space to strike, a probable advantage when speedy operation is being sought.

When the margin release is operated on the Remington, Royal and Smith-Corona the machine will travel on so that writing may be continued to the end of the machine's capacity.

On the Underwood typewriter the operation of the margin release permits the extension of the writing line by only four spaces. The notches are numbered from 0 to 6.

On the Remington, Royal and Smith-Corona the margin release also serves to permit the carriage to be drawn back past the initial starting point so that typing could be inserted on the left of the line of writing.



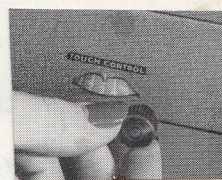
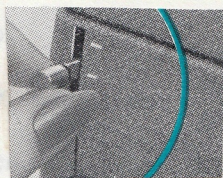
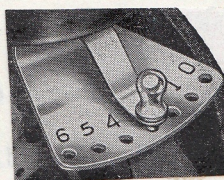
On the Underwood the margin release does not function on the left, but instead the Underwood (alone among typewriters) has a special left margin release latch.

It is located on the right front corner of the carriage (at B in illustration on page 14).

It is likely that most people would favor the machines having the single releasing device and perhaps would favor the unlimited release of these same three machines (Remington, Royal, Smith-Corona), although there is some difference of opinion on the advisability of the unlimited release.

10. TOUCH CONTROL

The touch control permits the operator to adjust the pressure or tension necessary for ease in typing. The touch assembly varies on all machines.



Smith-Corona Remington Underwood Royal

The Smith-Corona touch control is under the cover plate. It has seven notches in which a prong adjusts the touch for the operator. The notches are numbered from 0 to 6.

The Remington touch control is next to the ribbon indicator on the right side of the front plate. It has three variable positions as one moves the control up and down. If the lever is up, the touch is very light; in the center, medium; and at the bottom the tension is very firm.

The Underwood control is on the front plate at the left of the typewriter. It is numbered from left to right; 0 to 6, and the lever is placed into notches at the desired position by the operator.

The fourth position is the conventional disengaging of the

The Royal assembly is different from the other three in that it is not on the front, but on the right side of the machine in the lower base. It operates by a small knob that with knurled edges which turns a wheel that has numbers from 0 to 6 as on the other machines. If the pressure is set at "0" the tension is very light. The higher the lever on the assembly the harder the tension will be for the operator.

It is useless unless it were used for the black part of the ribbon in the red position.

11. RIBBON INDICATOR

The ribbon indicators on all machines are on the right side of the front cover plate, in which position they extend through the cover.

The Smith-Corona indicator is black, white and red colored to indicate the ribbon position desired when using a two-colored ribbon. The white indicates the position for cutting stencils. The lever indicator on this machine moves from right to left or from left to right.

The Underwood indicator is in a vertical position and its arrangement is blue, white and red. The lever operates on a notch system so the operator can adjust it quickly.

The Royal indicator operates the same as the Smith-Corona but has a wider span to move in order to set it into position. The color indicator is white, blue and red, which moves from right to left.

The Remington assembly has four positions for the indicator. One of these permits the use of the top of the ribbon; a second position is for the use of the bottom of the ribbon; a third position is for the use of the center of the ribbon; the fourth position is the conventional disengaging of the

ribbon mechanism so that (as for stencil-cutting) the type does not strike through the ribbon and the ribbon does not move from spool to spool. Supposedly the provision for the use of the center of the ribbon gives a more complete use of the ribbon.

The plain black ribbon is used almost entirely for school work. This would make the red ribbon indicator useless unless it were used for the black part of the ribbon in the red position. Books on the use of the typewriter say that the ribbon should be turned over occasionally rather than to apply the mechanism for the bottom part of the ribbon, since to do so increases the amount of work done in typewriting.

12. RIBBON REVERSE LEVER (MANUAL)

The purpose of the ribbon reverse lever is to aid the operator to reverse the ribbon at anytime, especially when the automatic ribbon reverse is not functioning.

The Remington, Royal and Smith-Corona ribbon reverse levers extend through the left front cover plate. The mechanism operates either for the right or left, depending on the position of the ribbon.

The Underwood is the only machine which has the ribbon reverse on the right side, extending through the right side plate. It is a knurled knob which when pushed in, turns the ribbon to the left spool, and if it is pulled out it reverses the ribbon to the right spool.

PRINTING MECHANISMS

As one can observe from the Plates which follow, the printing type mechanisms on the four typewriters are different. They differ in lever action which the writer could not attempt to evaluate or measure for the present comparisons.

IV. THE PRINTING MECHANISMS

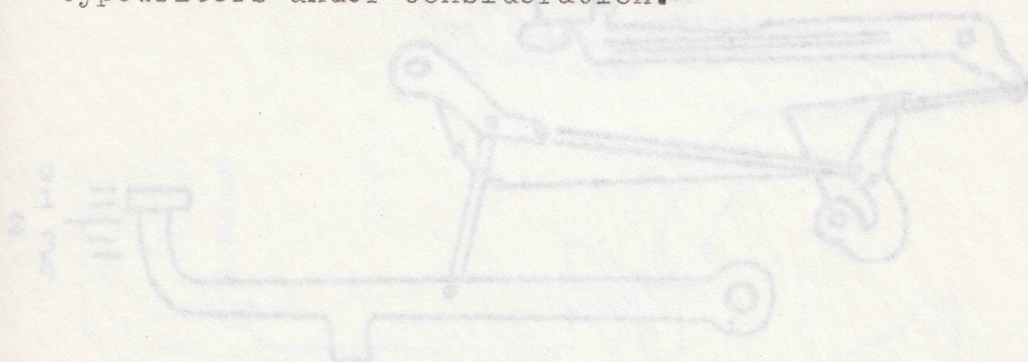
It is obvious that the engineers of the different typewriters have attempted to make the mechanisms suitable for the job each had to do. A mechanical engineer might understand the reasons back of the difference. For the teacher it is enough to note that while the performances of the various typewriters is much the same, the mechanical linkage by which this is brought about varies considerably among the four typewriters under consideration.

| | Page |
|----------------------|------|
| 1. ROYAL..... | 20 |
| 2. REMINGTON..... | 21 |
| 3. UNDERWOOD..... | 22 |
| 4. SMITH-CORONA..... | 23 |

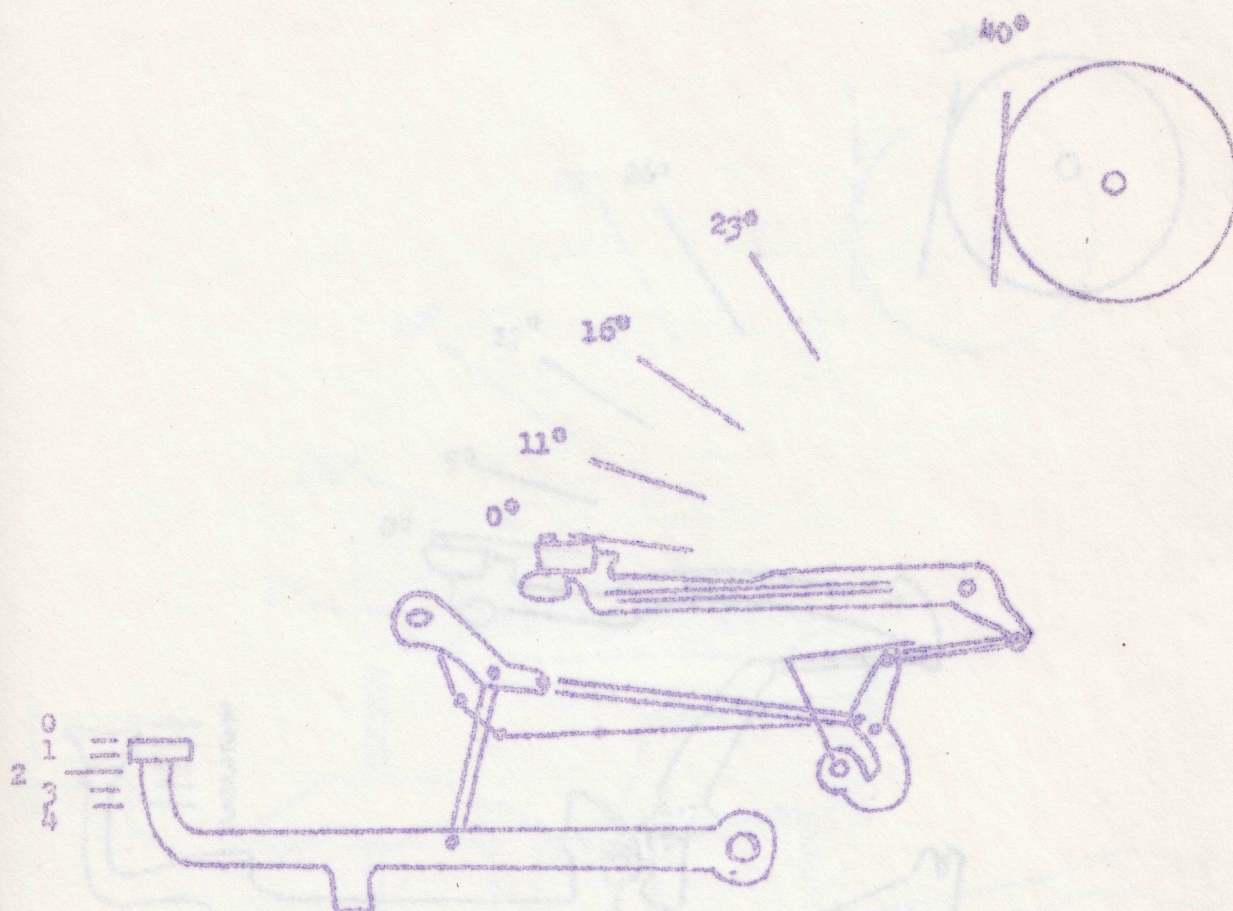
PRINTING MECHANISMS

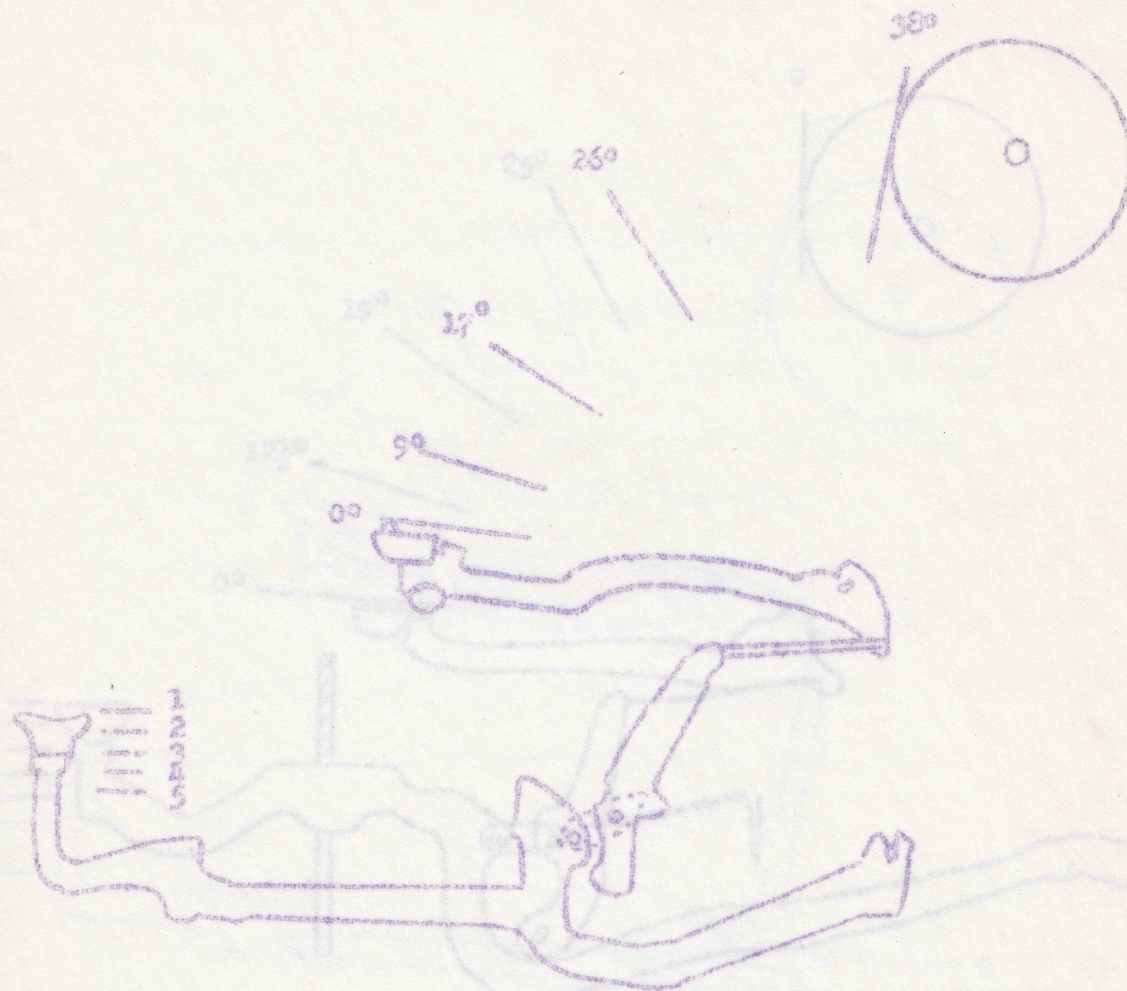
As one can observe from the Plates which follow, the printing type mechanisms on the four typewriters are different. They differ in lever action which the writer could not attempt to evaluate or measure for the present comparisons.

It is obvious that the engineers of the different typewriters have attempted to make the mechanisms suitable for the job each had to do. A mechanical engineer might understand the reasons back of the difference. For the teacher it is enough to note that while the performances of the various typewriters is much the same, the mechanical linkage by which this is brought about varies considerably among the four typewriters under consideration.

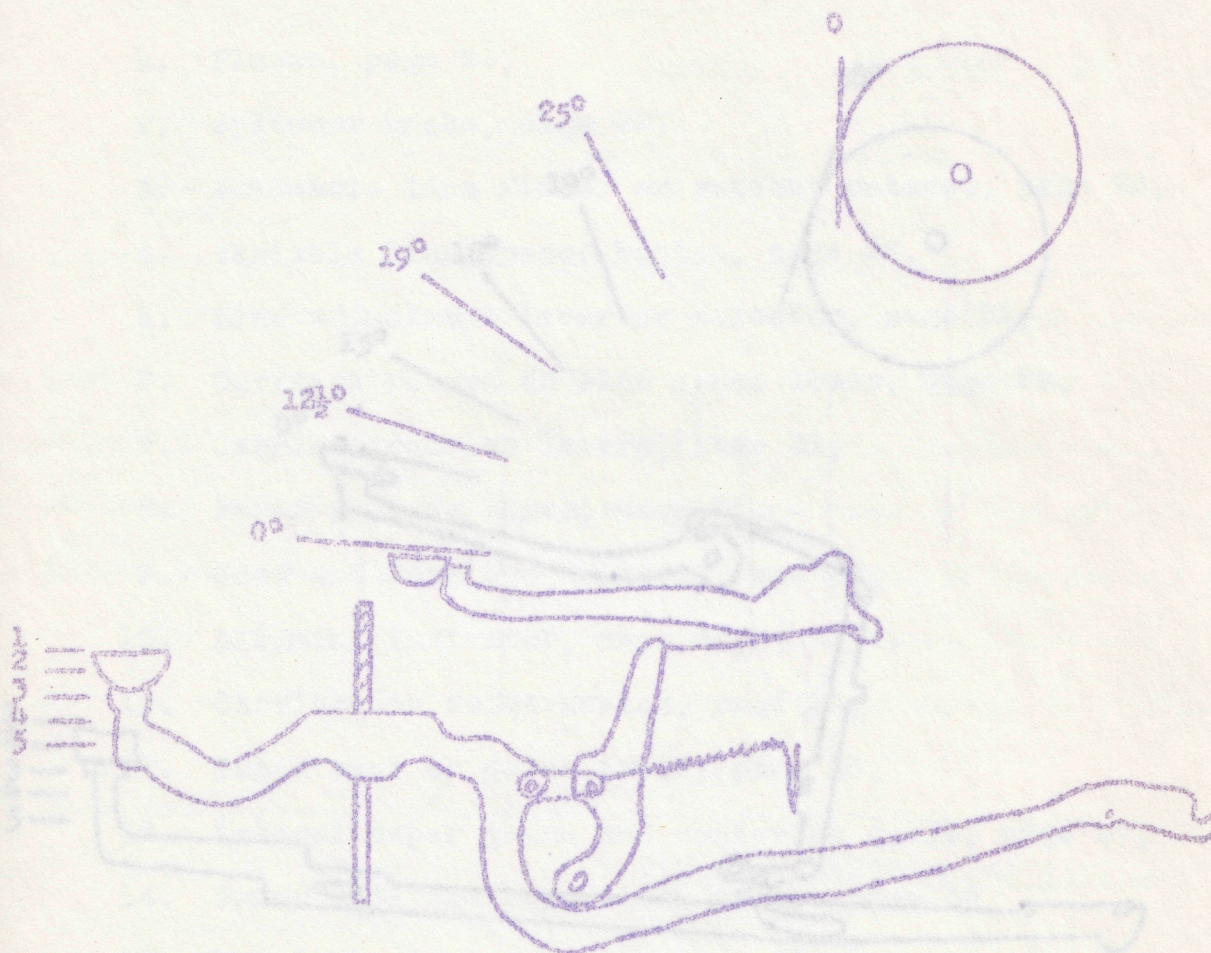


TOTAL





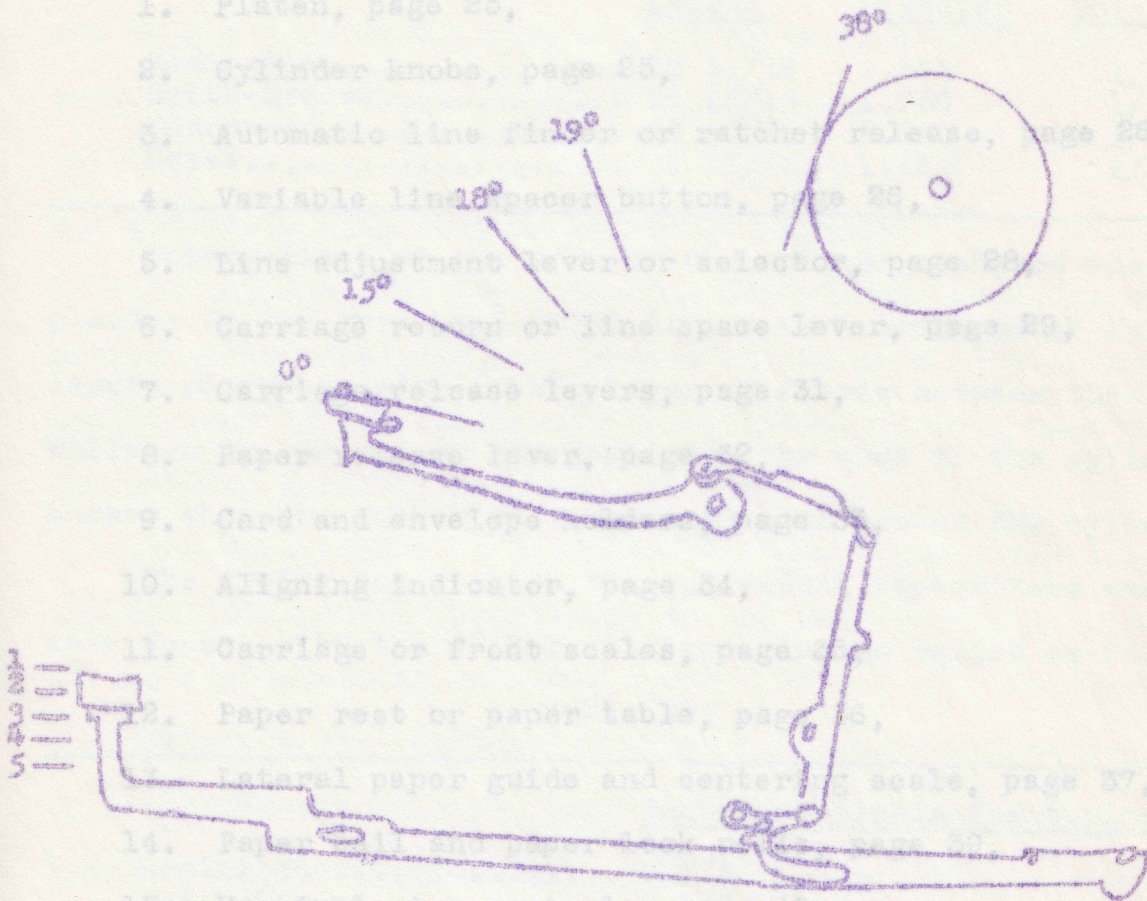
H. J. LINGGTON



UNDERWOOD

V. THE CARRIAGE AND ACCESSORIES

1. Platen, page 25,
2. Cylinder knobs, page 25,
3. Automatic line finder or ratchet release, page 26,
4. Variable line pecker button, page 26,
5. Line adjustment lever or selector, page 28,
6. Carriage return or line space lever, page 29,
7. Carriage release levers, page 31,
8. Paper rest lever, page 32,
9. Card and envelope rest, page 33,
10. Aligning indicator, page 34,
11. Carriage or front scales, page 35,
12. Paper rest or paper table, page 36,
13. Lateral paper guide and centering scale, page 37,
14. Paper rest lever, page 38,
15. Marginal stop controls, page 40.



SMITH-CORONA

1. PLATEN The platen is made of black rubber composition. They are different in length, diameter, and thickness. They are: (All measurements in inches.)

V. THE CARRIAGE AND ACCESSORIES

| | Length | Diameter | Thickness |
|-------------------------------------------------------|----------|----------|-----------|
| 1. Platen, page 25, | | | |
| 2. Cylinder knobs, page 25, | 11 1/16 | 1.594 | 1/4 |
| Smith-Corona..... | 10 15/16 | 1.750 | 1/4 |
| 3. Automatic line finder or ratchet release, page 26, | | | |
| Royal..... | 8 11/16 | 1.486 | 1/4 |
| 4. Variable line spacer button, page 26, | | | |
| 5. Line adjustment lever or selector, page 28, | | | |
| 6. Carriage return or line space lever, page 29, | | | |
| 7. Carriage release levers, page 31, | | | |
| 8. Paper release lever, page 32, | | | |
| 9. Card and envelope holders, page 33, | | | |
| 10. Aligning indicator, page 34, | | | |
| 11. Carriage or front scales, page 35, | | | |
| 12. Paper rest or paper table, page 36, | | | |
| 13. Lateral paper guide and centering scale, page 37, | | | |
| 14. Paper bail and paper lock rolls, page 39, | | | |
| 15. Marginal stop controls, page 40. | | | |
| Underwood..... | 8 | | |
| Royal..... | 8 1/8 | | |

2. CYLINDER KNOBS The cylinder knobs on all machines are to the right and left of the platen rollers. They are round knobs which are approximately one and three-fourths inches in diameter. The knobs are made of plastic material and differ only in design.

1. PLATEN Remington knobs are knurled with a crevice, centered through the platens on the four typewriters are of black rubber composition. They are different in length, diameter, and thickness. They are: (All measurements in inches.)

the Royal and they are made Table VI without the creviced center.

| | <u>Length</u> | <u>Diameter</u> | <u>Thickness</u> |
|-------------------|---------------|-----------------|------------------|
| Remington..... | 10 11/16 | 1.594 | 1/4 |
| Smith-Corona..... | 10 12/16 | 1.750 | 1/4 |
| Underwood..... | 10 10/16 | 1.750 | 1/8 |
| Royal..... | 9 11/16 | 1.486 | 1/4 |

3. AUTOMATIC LINE FINDER OR RATCHET RELEASE

Observations at the ends of the cylinders showed that the platens on the Royal and Smith-Corona were composed of two layers of rubber with a thin layer of fabric between them, while on the Underwood and Remington the ends of the cylinder showed that the rubber was one solid coat around the cylinder.

The line finder is attached to the cylinder barrel on all machines and is practically in the same position on each of the four machines compared.

The typing space which the individual typewriters are able to use with the different sized platens varied as follows:

Table VII

| | <u>Inches available for typing</u> |
|-------------------|------------------------------------|
| Remington..... | 9 3/4 |
| Smith-Corona..... | 8 1/2 |
| Underwood..... | 9 |
| Royal..... | 8 1/2 |

2. CYLINDER KNOBS

The cylinder knobs on all machines are to the right and left of the platen rollers. They are round knobs which are approximately one and three-fourths inches in diameter. The knobs are made of plastic material and differ only in design.

The Remington knobs are knurled with a crevice, centered through the middle of the knurl; the Royal knobs are identical, except the knurling is not grooved as the Remington.

The Underwood knurling is smaller than the Remington and the Royal and they are made plain without the creviced center.

The Smith-Corona knobs have the one-eighth inch crevices cut in the same as the other three typewriters. The knobs serve the same purpose on all machines. action remains suspended only so long as the operator keeps pushing in the button. These

3. AUTOMATIC LINE FINDER OR RATCHET RELEASE

On all machines the automatic line finder (also known as the ratchet release) is located on the left side of the machine and it is attached to the cylinder barrel, next to the ratchet spacer.

The line finder is attached to the cylinder barrel on all machines and is practically in the same position on each of the four machines compared.

When the line finder (or ratchet release) is returned to its ordinary position, line spacing which was established before the line finder was brought into use, will be restored.

4. VARIABLE LINE SPACER BUTTON

The variable line spacer button on all machines is inserted in the center of the left cylinder knob. The Smith-Corona variable line spacer button can be depressed inward to give the desired line for typing. The button can be twisted forward and it will latch into position so the typist can use the variable line spacer indefinitely.

The Underwood button has to be pulled out to give the typist the specific variation desired. As the button is pulled out it remains out and gives indefinite variable spacing. To put it back into its regular position the operator has to depress the button.

On the Royal and Remington the variable line spacer devices are much alike. Pushing in on the button suspends the ratchet action, as on the Smith-Corona but the action remains suspended only so long as the operator keeps pushing in the button. These machines do not use this device for suspending the ratchet action indefinitely, as would be desired when writing on ruled lines, and as provided by the Smith-Corona and the Underwood, but this is no particular disadvantage since these machines do have the automatic line finder to handle that job.

A summary comparison of the four typewriter as to the action of the variable line space button is:

1. Underwood--pull out. Action of ratchet suspended indefinitely.
2. Remington--push in. Action of ratchet suspended only while pushing.
3. Royal--push in. Action of ratchet suspended only while pushing.
4. Smith-Corona--push in. Ratchet suspended or not at the option of the operator.

The variable line spacer suspends the ratchet control but starts it again at whatever position the platen is in when the variable is returned to normal. The line spacing can be started a fraction of a space down the paper, in filling in

a ruled form and for any varied spacing which does not require a return to the original line. The variable line spacer button and the automatic line finder vary in their accomplishment only in the effect on the ratchet control when it is again restored to operation.

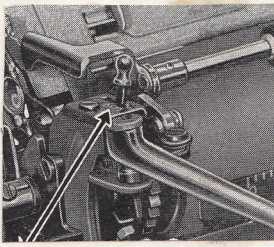
5. LINE ADJUSTMENT LEVER OR SELECTOR

The line adjustment lever is located on the Remington and Smith-Corona at the proximal end of the line spacer or carriage lever. On the Underwood and Royal it is located on the left side of the platen and is attached directly to the cylinder barrel.

On each adjustment lever there are Arabic numerals, 1, 2, 3, which indicates the amount of spacing that can be adjusted on the typewritten paper. On each machine the levers move to and from the operator, but the numbers are not arranged in similar positions. The Remington, Underwood, and Smith-Corona, Arabic numerals are arranged 1, 2, 3, toward the front of the cylinder, while the Royal numerals are, 3, 2, 1.

All lever actions work on the same principle. The pawl is adjusted to a cam. The selector is put into a notched wheel which gives the specified amount of lines indicated on the line spacer adjustment assembly. The figure 1 indicates single spacing, six line spaces to the inch when the carriage return lever is operated. Double spacing, indicated by a 2, gives a paper shift of $1/3$ of an inch, while triple spacing (rarely used), is indicated by a 3, and gives a shift of half an inch at each operation.

(Lever illustrated on page 30.)



On the Smith-Corona the selector fits into a notched portion of the assembly. The selector must be moved out of each notch and into another one, if a change is desired, much as one shifts the gears on an automobile. On the other three typewriters the change is made by merely sliding from one position to another. The Smith-Corona would seem to take more time to operate, but it would probably prove to be more certain when the mechanism became worn.

6. CARRIAGE RETURN OR LINE SPACE LEVER

The carriage return lever on all machines is attached to the left of the carriage. The Remington and Smith-Corona return levers are approximately 6 inches long, with a curved end toward the keyboard. The curved end on the two machines is $2 \frac{1}{2}$ inches long.

The Underwood lever is 3 inches long with a curved end of $1 \frac{1}{4}$ inches. The curved end on this machine is in an upward position away from the keyboard.

The Royal lever is $4 \frac{1}{2}$ inches and has a curved end of $1 \frac{1}{4}$ inches. The Royal and Underwood typewriters levers have a similar curved end which are in identical position for returning the carriage.

The Royal and Underwood levers make it difficult to throw the carriage return because of the short curved end which is turned up and away from the keyboard. The Smith-Corona and Remington have a shorter reach for the typist who normally keeps his hands poised above the keyboard. (Levers illustrated on page 30.)

7. CARRIAGE RELEASE LEVERS

The carriage action is commonly a movement of one space to the left with the operation of a key on the keyboard or the space bar. To suspend this action so that the carriage can be moved into position, right or left, at the will of the operator, is the function of the carriage release lever.

1. Royal

Carriage release levers on all four machines under consideration are located on both the right and left of the carriage.

2. Underwood

The Royal's lever on the right side of the carriage. The Royal's lever on the right side is in front of the automatic margin lever while the one on the left is behind the line space adjuster.

3. Smith-Corona

The Smith-Corona lever on the right side of the carriage. The Royal and Smith-Corona operate alike in that depressing one lever does not depress the companion lever.

The Underwood's lever on the left is behind the carriage return lever, while the one on the right is behind the left margin release latch.

4. Remington

The Remington lever is located in the same position as the Smith-Corona, which is behind the cylinder knobs. When either carriage release lever on the Remington and the Underwood machines is operated both levers move, thus differing

CARRIAGE RETURN OR LINE SPACE LEVER
(not actual size)

All machines levers perform similarly--when the lever is depressed the carriage can be placed into the desired position.

7. CARRIAGE RELEASE LEVERS

The carriage action is commonly a movement of one space to the left with the operation of any key on the keyboard or the space bar. To suspend this action so that the carriage can be moved to any position, right or left, at the will of the operator, is the function of the carriage release lever.

Carriage release levers on all four machines under consideration are located on both the right and left of the carriage. of all carriages. They differ in shape and position. The Royal levers are on the right and left side of the carriage. The Royal's lever on the right side is in front of the automatic margin lever while the one on the left is behind the line space adjuster. as the rollers underneath the

Smith-Corona's releases are located to the inside of the cylinder knobs and are in similar position on the right and left. The Royal and Smith-Corona operate alike in that depressing one lever does not depress the companion lever. forward it releases The Underwood's lever on the left is behind the carriage return lever, the one on the right is behind the left margin release latch. on because on the Remington the action does

The Remington releases are located in the same positions as the Smith-Corona, which is behind the cylinder knobs. When either carriage release lever on the Remington and the Underwood machines is operated both levers move, thus differing from the Royal and Smith-Corona. freely.

All machines levers perform similarly--when the lever is depressed the carriage can be placed into the desired position.

8. PAPER RELEASE LEVER

When paper is rolled into the typewriter it is gripped between the platen and a set of rollers. When it is necessary to adjust the position of the paper--particularly when it is not feeding straight--it is necessary to release the grip of the rollers and for this purpose machines are equipped with a paper release lever. Remington, Underwood and Royal are operated

The paper releases on all machines are located to the right side of all carriages. They differ in shape and position. Position by hand by pressing the stub which holds the card

On the Remington the paper release is a lever mechanism behind the right carriage release lever. It operates by pulling a lever forward which depresses the rollers underneath the paper so that the paper can be moved freely around the platen.

The Underwood's paper release is on the right side of the cover plate and extends approximately one and one-half inches above the carriage. If the paper release is pulled forward it releases the paper as on the Remington and it also lifts the paper bail so that it too will clear the platen. This differs from the Remington because on the Remington the action does not simultaneously lift the paper bail. that the pencil or

The Royal's paper release operates the same as on the Remington and it is located in the same position. As the lever is pulled forward the paper rollers beneath the platen drop and allow the paper to move freely.

The Smith-Corona release operates the same as the other three except that when it is pulled forward the front scale

is released at the same time, giving the paper much freedom.

9. CARD AND ENVELOPE HOLDERS

All machines have card and envelope holders attached to the aligning assembly. They are different in appearance and shape. The Remington, Underwood and Royal operate on spring attachments, while the Smith-Corona is operate completely by hand, while the Remington, Underwood and Royal are operated by a semimanual method.

The Smith-Corona is put into position and released from its location by hand by pressing the stub which holds the card in position. If there is no use for the stubs they are released from their location by depressing a small lever on the back side of the mechanism which snaps the stubs out of the way.

On the Remington the card and envelope holder is placed upright by hand. To remove it from its position near the platen, in order to increase visibility along the writing line, a lever is depressed which springs the holder away from the platen. The holders on the Remington are unique in that one contains a round hole and the other one contains a triangular slot. These allow a pencil or pen to be inserted and brought in contact with the typewriting paper so that the pencil or pen may be held firmly while the carriage or the platen is moved in drawing straight lines.

The Royal card and envelope holders device is much like the Remington but with the hole and slot.

The Underwood is much the same as Remington and Royal, but with a large triangular cut-out, which might serve the

same line-drawing purpose as the hole and the slot in Remington's holder device.

Operations such as this can save much time if properly done. The stubs can be left in a fixed position at all times. The need of releasing the stubs comes when the operator wants a clear view in reading matter which has just been typed.

10. ALIGNING INDICATOR

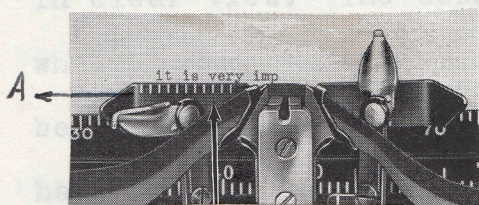
The aligning indicators on all machines differ in length, shape and position on the typewriter.

The overall length of the alignment assembly:

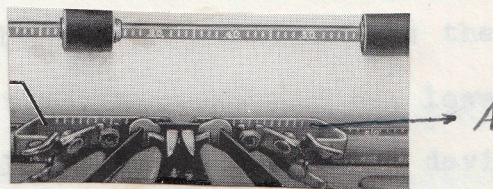
Table VIII

| | <u>Inches</u> |
|-------------------|---------------|
| Smith-Corona..... | 3 1/4 |
| Royal..... | 4 1/8 |
| Remington..... | 4 1/4 |
| Underwood..... | 6 1/4 |

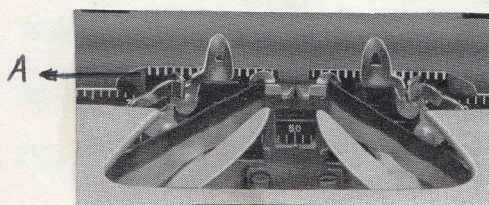
The aligning indicators are parallel with the platen and with the ends turned at a 45-degree angle from the platen, except for the Underwood which does not have the ends turned.



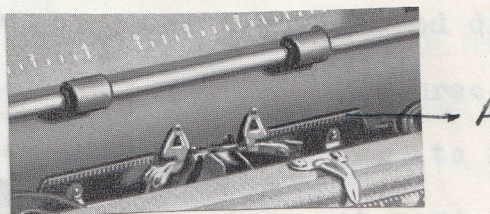
Smith-Corona



Royal



Remington



Underwood

on the Underwood usually can be set quickly with the clear and convenient vision of the front scale.

13. The gradations on the front scales indicate the possible printing points in the line of writing. This scale comes into practical use for establishing margins, and in tabulating work, or for locating any desired starting position for columns, figures, and other work. It also is useful for making certain that the paper is straight and that the lines are level across the sheet.

12. PAPER REST OR PAPER TABLE

The paper rest on all machines is behind the platen. It differs on all machines in size, shape and movability. On the Underwood it is stationary.

The Royal's paper rest is attached to the bar at the bottom of the paper table and can be moved forward by pulling the table rest assembly. Small springs hold it in permanent position, making it very easy for the operator to handle.

The Smith-Corona paper rest is attached in the same manner as the Royal. It is held in position by metal pressure bars.

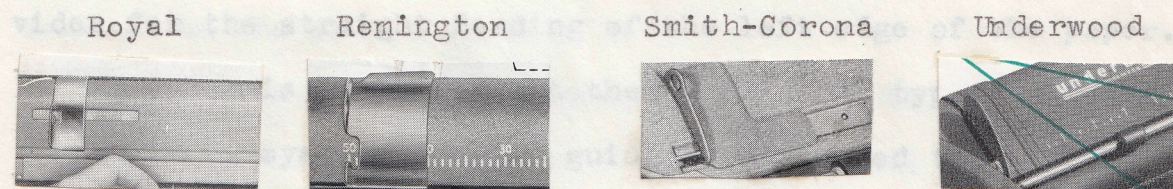
The Remington paper rest is the only one that has to be removed so that the operator can make adjustments beneath it if necessary. The table is curved to fit the four round nodes which hold it in position. The table is triangular in shape and is very easily removed. To remove it one pulls the table firmly off the nodes.

All the typewriters have the paper centering scale marked

on the paper rest. The proper insertion of paper the four typewriters under consideration all provide two devices located

13. LATERAL PAPER GUIDE AND CENTERING SCALE

The lateral paper guides are on the left side of the paper rest or paper table on all machines. piece of metal which pro-



They vary in size and shape. The guide angle on the Royal, Remington and Smith-Corona are bent at a 90-degree angle, with a one-fourth inch flange to guide the paper. The Underwood has the identical flange bend as the other three machines but differs because of a one-fourth inch extension on the flange.

The guides on the Royal and Underwood are movable the complete length of the paper rest, while the Smith-Corona and Remington move approximately five inches or only one-half the length of the paper rest. Some types of work could be done on the Royal and Underwood with greater convenience, for on them the construction is such as to allow a complete movement of the guide across the paper rest.

The guides on the Royal, Underwood and Smith-Corona are attached to the paper rest and thus differ from the Remington. The paper guide on the Remington is attached to the margin assembly beneath the paper rest. The paper guide on the Underwood with its longer extended flange makes for easier guiding of the paper compared to the other three typewriters which have the short flanges.

For help in the proper insertion of paper the four typewriters under consideration all provide two devices located on the paper rest or paper table. These are the paper guide and a centering scale, which on the Smith-Corona are one device. The guide is in each case a movable piece of metal which provides for the straight feeding of the left edge of the paper. Its position is adjustable at the will of the typist.

On the Royal, the paper guide can be moved the complete length of the paper table, but the scale which helps the typist decide where he wants the guide will serve for only $2\frac{1}{2}$ inches.

On the Underwood, the paper guide can be moved the complete length of the paper table and it has the advantage of a scale at any point.

On the Remington the paper guide will move only 4 or 5 inches while on the Smith-Corona it will move only 3 inches.

The paper centering scale on the Underwood is imprinted on the paper table. It is numbered 4 inches each way from a center point.

The Royal scale is also on the paper table at the left, being 20 typewriter spaces long.

The Remington scale is imprinted on the paper table and is marked for 110 typewriter spaces.

The Smith-Corona scale is a separate strip of metal attached to the paper guide and works through a groove in the paper table. It is graduated in eighths of an inch and is 3 inches long.

14. PAPER BAIL AND PAPER LOCK ROLLS

The paper bails on all machines are located on the carriage assembly. All machines have the metal bails. On the Remington and Royal there is a paper bail scale which has markings the same as on the platen scale.

The bails on the Underwood, Royal, and Remington are 11 1/4 inches long, while the Smith-Corona bail is 12 1/2 inches long.

All the paper bails perform the same duty of holding the materials against the platen. Differences come in the manner of their operation. The Remington bail moves forward, latches backward and rests on the paper table. The Underwood is less flexible--that is, it moves only in a quarter arc toward the paper table and back to the platen. The Royal and Smith-Corona move forward the same as the Remington and latches backward over the paper table.

The Smith-Corona and Royal's paper bails can be put into position with a flip of the finger, while the Underwood and Remington require a more extended operation to take them from position to position.

Another difference is that the Smith-Corona, Remington, and Royal have springs to guide the bails into position, while the Underwood is simply attached to the carriage assembly and is operated without benefit of springs.

All machines have two paper lock rolls on the rod of the paper bail. They are made of rubber, and they vary in size and slide the complete length of the paper bail. These paper

lock rolls are attached with small tubes to the paper bail, they rotate when the platen is turned and aid in advancing paper uniformly. Their sizes in inches are:

Table IX

| | <u>Length</u> | <u>Thickness</u> |
|-------------------|---------------|------------------|
| Remington..... | 9/16 | 3/16 |
| Royal..... | 10/16 | 3/16 |
| Underwood..... | 12/16 | 3/16 |
| Smith-Corona..... | 14/16 | 2/16 |

15. MARGINAL STOP CONTROLS

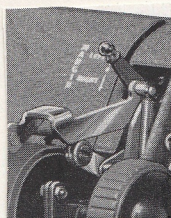
The length of the writing line is regulated by marginal stops. The Remington, Underwood and Royal have the controls of these stops on the right and left sides of the machines, the Smith-Corona is that the lever whether for right or left but vary considerably in position.

On the Remington they are located just above the back spacer on the left and above the margin release on the right; they are elevated above the top row of keys and are marked, "KMC" or keyboard margin control, and Smith-Corona's margin control levers are all recent devices. In the development of the Underwood, the front scale has remained convenient for the margin controls. The advantages of the Underwood are evident since no positioning of the machine is required and no possibility of an accidental striking of the lever moving the stops inadvertently.

The Underwood marginal releases are attached to the front scale assembly. To set the marginal stops one presses the handles together and moves the marginal stops to the desired position. This machine's mechanism is moved by hand along a scale and does not require the positioning of the carriage.

The Royal margin releases are attached to the carriage on each side of the paper table. They are marked "Magic" and operate by pulling the releases forward and moving the

carriage into the desired position; this can be done for the left and for the right from opposite sides of the carriage.



The Smith-Corona is quite different in that it has the setting lever for the marginal stops to the right side of the machine which is to the right of the paper table, where it is attached to the carriage frame. It operates by a forward and backward motion. If the lever is pressed backwards the left margin can be set by moving the carriage to the desired position. To set the right margin one would depress the lever forward after positioning the carriage. The paper table indicates right and left margins by arrows and words of "Right" and "Left."

One advantage in the marginal stops on the right side of the Smith-Corona is that the lever whether for right or left controls can be operated by a one-hand operation, while on the other machines both hands must take part.

The Royal's "Magic" margin stop-setting device, Remington's "KMC" or keyboard margin control, and Smith-Corona's margin control levers are all recent devices. In the development of the Underwood, the front scale has remained convenient for the margin controls. The advantages of the Underwood are evident, since no positioning of the machine is required and no possibility of an accidental striking of the lever moving the stops inadvertently.

VI. TYPE FACES

There are many small differences in type faces, a fact unknown to many people to whom all typewriting looks alike. On the four typewriters under consideration the type faces are those which each manufacturer considers his standard.

There is here presented a sample of the writing of the four typewriters under consideration, showing ten characters of each type of each machine. After this presentation will be found a discussion of those type faces that have outstanding differences, letter by letter and character by character.

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| AAAAAAAAAA | AAAAAAAAAA | AAAAAAAAAA | AAAAAAAAAA |
| aaaaaaaaaa | aaaaaaaaaa | aaaaaaaaaa | aaaaaaaaaa |
| BBBBBBBBBB | BBBBBBBBBB | BBBBBBBBBB | BBBBBBBBBB |
| bbbbbbbbbb | bbbbbbbbbb | bbbbbbbbbb | bbbbbbbbbb |
| CCCCCCCCCC | CCCCCCCCCC | CCCCCCCCCC | CCCCCCCCCC |
| cccccccccc | cccccccccc | cccccccccc | cccccccccc |
| DDDDDDDDDD | DDDDDDDDDD | DDDDDDDDDD | DDDDDDDDDD |
| dddddddddd | dddddddddd | dddddddddd | dddddddddd |

ROYAL

EEEEEEEEEE

eeeeeeeeee

FFFFFFFFFF

ffffffffff

GGGGGGGGG

ggggggggg

HHHHHHHHH

hhhhhhhhh

IIIIIIIIII

iiiiiiiiii

JJJJJJJJJ

jjjjjjjjj

KKKKKKKKK

kkkkkkkkk

LLLLLLLLL

lllllllll

MMMMMMMMM

mmmmmmmmm

REMINGTON

EEEEEEEEEE

eeeeeeeeee

FFFFFFFFFF

ffffffffff

GGGGGGGGG

ggggggggg

HHHHHHHHH

hhhhhhhhh

IIIIIIIIII

iiiiiiiiii

JJJJJJJJJ

jjjjjjjjj

KKKKKKKKK

kkkkkkkkk

LLLLLLLLL

lllllllll

MMMMMMMMM

mmmmmmmmm

SMITH-CORONA

EEEEEEEEEE

eeeeeeeeee

FFFFFFFFFF

ffffffffff

GGGGGGGGG

ggggggggg

HHHHHHHHH

hhhhhhhhh

IIIIIIIIII

iiiiiiiiii

JJJJJJJJJ

jjjjjjjjj

KKKKKKKKK

kkkkkkkkk

LLLLLLLLL

lllllllll

MMMMMMMMM

mmmmmmmmm

UNDERWOOD

EEEEEEEEEE

eeeeeeeeee

FFFFFFFFFF

ffffffffff

GGGGGGGGG

ggggggggg

HHHHHHHHH

hhhhhhhhh

IIIIIIIIII

iiiiiiiiii

JJJJJJJJJ

jjjjjjjjj

KKKKKKKKK

kkkkkkkkk

LLLLLLLLL

lllllllll

MMMMMMMMM

mmmmmmmmm

ROYAL

NNNNNNNNNN

nnnnnnnnnn

0000000000

0000000000

PPPPPPPPPP

pppppppppp

Qqqqqqqqqq

qqqqqqqqqq

RRRRRRRRRR

rrrrrrrrrr

SSSSSSSSSS

ssssssssss

TTTTTTTTTT

tttttttttt

UUUUUUUUUU

uuuuuuuuuu

VVVVVVVVVV

vvvvvvvvvv

REMINGTON

NNNNNNNNNN

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The Capital "A"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| AAAAAAAAAAAA | AAAAAAAAAAAA | AAAAAAAAAAAA | AAAAAAAAAAAA |

The Remington and Smith-Corona capital "A's" have larger "bases." The Royal and Underwood do not spread so much.

The Capital "B"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| BBBBBBBBBBBB | BBBBBBBBBBBB | BBBBBBBBBBBB | BBBBBBBBBBBB |

The Smith-Corona capital "B" has an extended serif at the top and bottom, the other three type faces have shorter serifs.

The Lower Case "b"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| bbbbbbbbbbb | bbbbbbbbbbb | bbbbbbbbbbb | bbbbbbbbbbb |

The lower case "b" on the Smith-Corona has a longer serif compared to the other three typewriter types.

The Lower Case "d"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| ddddddddddd | ddddddddddd | ddddddddddd | ddddddddddd |

The lower case "d" on the Royal, Remington and Smith-Corona have the top serif longer than the Underwood.

The Capital "E"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| EEEEEEEEEEE | EEEEEEEEEEE | EEEEEEEEEEE | EEEEEEEEEEE |

The capital "E" on the Smith-Corona is closed more than the other three typewriters.

The Capital "G"

| | | | |
|--------------|------------------|---------------------|------------------|
| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
| GGGGGGGGGG | GGGGGGGGGG | GGGGGGGGGG | GGGGGGGGGG |

The capital "G" on the Smith-Corona has the stem closer to the cap than the other three typewriters.

The Capital "M"

| | | | |
|--------------|------------------|---------------------|------------------|
| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
| MMMMMMMMMM | MMMMMMMMMM | MMMMMMMMMM | MMMMMMMMMM |

The capital "M" on the Royal has the two middle lines coming fully to the bottom edge of the "M's" base. The Remington and Smith-Corona capital "M's" have this feature coming only three-fourths of the distance of the letter while on the Underwood the middle lines come only one-half the distance.

| | | | |
|--------------|------------------|---------------------|------------------|
| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|

The Capital "W" and Lower Case "w"

| | | | |
|--------------|------------------|---------------------|------------------|
| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
| WWWWWWWWWW | WWWWWWWWWW | WWWWWWWWWW | WWWWWWWWWW |
| wwwwwwwwww | wwwwwwwwww | wwwwwwwwww | wwwwwwwwww |

The capital "W's" on the Royal brings the middle lines fully to the top just as its capital "M" letter extends to the bottom. The Remington capital "W" middle section comes one-half the distance toward the top of the letter, while on the Smith-Corona and Underwood the center section extends three-fourths of the way toward the top of the letter.

The lower case "w's" on the four machines have center sections similar to their capital "W's".

The Number "3"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| 3333333333 | 3333333333 | 3333333333 | 3333333333 |
| 5555555555 | 5555555555 | 5555555555 | 5555555555 |
| 7777777777 | 7777777777 | 7777777777 | 7777777777 |
| 9999999999 | 9999999999 | 9999999999 | 9999999999 |

The "3's" on the Remington, Smith-Corona and Underwood have an extended lower stem. The Royal "3" has a flat top and rounded curve stem which stays above the line of writing--the other typewriter "3's" stems extend below the line.

The "5's," "7's," and "9's" have similar extended stems as on the "3" except the Royal's "7" which is cut short.

Identical settings, while the Smith-Corona has its face set on one vertical point. The Number "4"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| 4444444444 | 4444444444 | 4444444444 | 4444444444 |

The "4" on the Smith-Corona and Underwood have the same type of opening at the top. The Remington differs in that it's open slant extends to the vertical bar. The Royal "4" is the only one which has the closed top.

The Number "8"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| 8888888888 | 8888888888 | 8888888888 | 8888888888 |

The Remington and Underwood "8's" have small "caps" on the right top side, while on the Royal and Smith-Corona have the uniform round characters.

similar "4's" that is they have a closed top on the four. The Underwood is different in that it has an open top on the

figure.

The Dollar Sign "\$"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------------|--------------------|---------------------|--------------------|
| \$\$\$\$\$\$\$\$\$ | \$\$\$\$\$\$\$\$\$ | \$\$\$\$\$\$\$\$\$ | \$\$\$\$\$\$\$\$\$ |

The differences in the dollar signs are quite noticeable. The Royal, Remington and Underwood have double bars running vertically. The Smith-Corona differs in that it has only one vertical bar.

The Asterisk "*"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| ***** | ***** | ***** | ***** |

The asterisk on the Royal, Remington and Underwood have identical settings, while the Smith-Corona has its face set on one vertical point.

The Question Mark "?"

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|--------------|------------------|---------------------|------------------|
| ????????? | ????????? | ????????? | ????????? |

The "?" on the Royal, Remington and Underwood are similar but the "?" on the Smith-Corona has a smaller top and a longer stem.

The " $\frac{1}{4}$ "

| <u>ROYAL</u> | <u>REMINGTON</u> | <u>SMITH-CORONA</u> | <u>UNDERWOOD</u> |
|---------------------------|---------------------------|---------------------------|---------------------------|
| $\frac{1}{4}$ 44444444 | $\frac{1}{4}$ 44444444 | $\frac{1}{4}$ 44444444 | $\frac{1}{4}$ 44444444 |

The " $\frac{1}{4}$ " on the Royal, Remington and Smith-Corona have similar " $\frac{1}{4}$'s" that is they have a closed top on the fours. The Underwood is different in that it has an open top on the

figure.

There are many other differences in the 84 figures which appear on the standard typewriter type faces. The writer has included some differences which can be easily observed when one's attention is directed to the specific characters.

VII. CONCLUSIONS

The differences in construction of the various typewriters are numerous, giving clear evidence of much engineering thought by the builders of the four typewriters. Perhaps most of these differences go unnoted by teachers and users of typewriters and certainly a study of them was enlightening to this investigator.

This study may be used as a starting point for further studies. New models of these four well-known typewriters may be examined to see what changes the engineers will be making in the future. Other typewriters, both old and new, may also be compared with the four which has been the basis for this study.

It would be possible also for someone to devise a rating scheme and give points to each typewriter on the basis of each part of this examination and thus work toward a scientific determination of how these typewriters rank along the lines compared.

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